Translation of pertinent portions of a response from KBA, dated 03/13/2006

IN RESPONSE TO THE NOTIFICATION DATED 02/06/2006, CHANGES IN ACCORDANCE WITH ART. 34 PCT ARE BEING SUBMITTED

1. The following are being submitted:

1.1 Claims
(Replacement pages 41 to 44, version dated 03/13/2006)

1.1.1. New Claim 1

The new claim 1 has been formed from characterizing features of the original claims 4, 118, 119 and 134, and from characterizing features that can be taken from page 36, paragraph 1 of the description. The preamble to the new claim 1 has been clarified with respect to the original characteristic "during the transport", which was process-based in its formulation.

1.1.2. New Claim 2

The new claim was formed from characterizing features of the original claims 1 and 6.

1.1.3. New Claims 3 through 15

The original claims 98, 120, 121, 122, 135, 136, 138, 142 through 145 and 156 and 157 have been renumbered as new claims 3 through 15 and the references have been amended appropriately.

1.1.4. Remaining Claims

The remaining claims have been stricken.

1.2 Introduction to the Description

(Replacement pages 1 and 6, version dated 03/13/2006)

The title has been changed to "Printing Machine with at Least one Machine Element that Can be Adjusted Using a Setting Element ". The third paragraph on page 1 of the description, and the statement of the object have been amended accordingly.

The phrase "of claim 1, 2, 3, 4 or 5" has been changed to "of claim 1".

2. Novelty and Inventive Step

Based upon D15 (= GB 2 119 505 A), the object of the present invention is to create a printing machine having at least one machine element that can be adjusted with a correcting element, wherein a quality of the printing can be adjusted, and will be stable at the adjusted level during the print run, in that an interaction between the control device, the detection device the correcting elements and the machine elements is improved.

The object is attained with a printing machine having the characterizing features of the new claim 1.

The advantage of the solution arrived at consists in that, in addition to fan-out compensation, additional control operations necessary for achieving the quality of the printing to be produced are initiated from an analysis of the same data provided by the optical detection device.

Attachments
Claims, Replacement pages 14 through 44,
Description, Replacement pages 1 and 6,
Each in the version dated 03/13/2006, in triplicate

Claims

1. Printing machine having at least one machine element (08) that can be adjusted with a correcting element (07), wherein an adjustment of the at least one machine element (08) affects a quality of a printing performed by the printing machine, wherein an optical detection device (11) having a sensor that is directed toward a surface of a printing substrate printed in the printing machine detects the quality of the printing on the printing substrate transported through the printing machine, and wherein a control device (12) that receives data from the optical detection device (11) uses the correcting element (07) to adjust the at least one machine element (08) based upon a difference between a quality of the printing that is preset as the target value and the quality of the printing that is detected by the optical detection device (11) as the actual value, in a manner that serves to minimize the difference between the target value and the actual value, wherein the optical detection device (11) simultaneously detects two marks or measurement fields, which are arranged crosswise to the direction of transport of the printing substrate and are incongruent in a spacing or at least in their respective positions, characterized in that the optical detection device (11) detects the two marks or measurement fields, both of which are assigned to the same color patch, simultaneously, wherein, when a difference is identified between the target value and the actual value, the control device (12) implements a change in the spacing between the two marks or measurement fields, crosswise to the direction of transport of the printing substrate, wherein the control device (12) uses the correcting element (07) to adjust the at least one machine element (08) based upon the identified change in said spacing, wherein additional machine elements (08), each of which can be adjusted using a correcting element (07), are provided, wherein the correcting elements (07) of different machine elements (08) can be adjusted independently of one another by the control device (12), wherein the adjustment of

the different machine elements (08) serves to counteract interfering factors having different causes and different temporal behavior or different surface effects on the printing, wherein, when a difference between the target value and the actual value exists, the control device (12) analyzes the data from the optical detection device (11) with respect to the interfering factor causing the difference, its temporal behavior and/or its surface effect on the printing, and initiates the control operations necessary to achieve the quality of the printing to be produced, from the analysis of the same data provided by the optical detection device (11), wherein said control operations act upon different machine elements (08).

2. Printing machine according to claim 1, characterized in that at least one machine element (08) is a temperature-control device for controlling the temperature of at least a part of a circumferential surface of a rotational body of the printing machine, wherein said rotational body is involved in the transport of a printing ink to the printing substrate being printed with said ink in the printing machine.

3. Printing machine according to claim 1, characterized in that the control device (12) implements the process of adjusting the at least one machine element (08) continuously during the printing.

4. Printing machine according to claim 1, characterized in that at least the optical detection device (11), the control device (12) and the correcting element (07) are connected to one common data bus.

5. Printing machine according to claim 1, characterized in that the control device (12) controls at least one guide element arranged in the printing machine for guiding the printing substrate during its transport through the printing machine, or regulates said guide element via a correcting element (07), based upon the data

provided by the optical detection device (11).

6. Printing machine according to claim 5, characterized in that the control device (12) regulates the guide element via a correcting element (07) for the centering of the printing substrate.

7. Printing machine according to claim 1, characterized in that at least one machine element (08) that acts upon the mechanical technology and at least one machine element that acts upon the properties of the material being used in the printing, especially the ink, are both provided, wherein, in the event of a difference between the target value and the actual value, the control device (12) utilizes the differently acting machine elements (08) based upon the necessity determined from the data collected by the optical detection device (11).

8. Printing machine according to claim 1, characterized in that, in the event of a difference between the target value and the actual value, the control device (12) induces multiple correcting elements (07) and/or machine elements (08) to a joint, coordinated, synergetic reaction on the interfering factor causing the difference.

9. Printing machine according to claim 1, characterized in that the control device (12) evaluates different interfering factors identified from the data from the optical detection device (11) in parallel process branches.

10. Printing machine according to claim 1, characterized in that, when a paper web break

is identified, the control device (12) uses a signal (s) to control a web intercept device, based upon the data provided by the optical detection device (11).

11. Printing machine according to claim 1, characterized in that, when a paper web break is identified, the control device (12) uses a signal (s) to control a web severing device, based upon the data provided by the optical detection device (11).

12. Printing machine according to claim 1, characterized in that, when a serious interference in the production being implemented with the printing machine is identified, the control device (12) shuts down the printing machine based upon the data provided by the optical detection device (11).

13. Printing machine according to claim 12, characterized in that the serious interference is a tear in the printing substrate.

14. Printing machine according to claim 1, characterized in that the control device (12) controls a switch for changing the transport pathway of the printing substrate based upon the data provided by the optical detection device (11).

15. Printing machine according to Claim 14, characterized in that the switch feeds a printed product identified by the control device (12) to be of good quality to a first delivery and a printed product identified to be of poor quality to a second delivery.

Description

Printing Machine Having at Least one Machine Element That Can Be Adjusted By a Setting Element

The invention relates to a printing machine having at least one machine element that can be adjusted using a correcting element, in accordance with the preamble to claim 1.

From EP 0 763 426 B1 and from DE 195 33 822 A1, which establishes the priority of the former publication, a method for controlling inking in printing with a printing machine, especially a sheet-fed offset printing machine comprising multiple printing couples, is known, in which, for example, an imaging device is used to obtain actual colormetric values for a multitude of selected measuring points distributed over the entire surface of an image substrate, and these are stored as reference values for at least one subsequent printing, wherein in the subsequent printing actual values are obtained at measuring points that coincide with the previously selected measuring points, wherein the inking in the print run is controlled only at those measuring points that change the most, by means of correcting elements that act upon said measuring points. Elements for correcting the coating thickness of the printing ink, for correcting the quantity of dampening agent, and for correcting the register, all of which are active in zones, are listed as correcting elements. A control unit that controls the respective correcting elements and an imaging device that scans the entire printed surface of a sheet are provided. Inputs into a data processing unit that is connected to the control unit can be accomplished via a keyboard.

From EP 0 598 490 A1 a color register system for a printing machine is known, wherein a computer uses a camera or a group of cameras to detect any misalignment of colors in a printed image by comparing a relevant image with a stored reference image, and uses a print controller to align a longitudinal, transverse, and rotational position of cylinders in the printing machine relative to a

following a change in the setting of one or more machine elements. This approach results in a complex control system for the printing machine, in which the quality of the printing is viewed as a controlled process that inhibits interfering factors and must be regulated.

The object of the invention is to create a printing machine having at least one machine element that can be adjusted with a correcting element, wherein a quality of the printing can be adjusted and will be stable at the adjusted level in the print run.

The object is attained according to the invention with the characterizing features of claim 1.

The benefits that can be achieved with the invention consist especially in that a quality of the printing can be adjusted and can be maintained at the adjusted level in the print run. An interfering factor that negatively influences the quality of the printing is effectively counteracted in a synchronized manner, viewed with other interfering factors, as soon as the detection device detects the negative effect of the interfering factor on the quality of the printing. This is possible because the detection device is capable of detecting all interfering factors that affect the quality of the printing. A simultaneous detection of all interfering factors, both in real time and near the location at which the quality of the printing is produced, enables a rapidly effective control from an evaluation of the output signal from only one detection device, so that with respect to the printing, a stable operating state producing good quality can be achieved after only a very short time. The detection of the quality of the printing in its entirety, combined with an evaluation of the data that correlate with it with respect to multiple, preferably all, interfering factors that adversely affect the quality of the printing, means a substantial reduction of work for an operator operating the printing machine, as he/she is not required to monitor and/or operate a multitude of different control and/or regulating devices.